

Interactive comment on “Constraining CO₂ emissions from open biomass burning by satellite observations of co-emitted species: a method and its application to wildfires in Siberia” by I. B. Kononov et al.

Anonymous Referee #2

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This paper presents a method to estimate CO₂ emissions from open biomass burning using constraints on biomass burning rate obtained from satellite measurements of co-emitted CO and AOD, and applies the method to the case of Siberia wildfires. Key features of the method involve the derivation of the FRP-to-BBR conversion factors for different vegetation types, the optimization of the FRP-to-BBR conversion factors derived from CO and AOD, and the estimation of the diurnal cycles of FRP. A mesoscale chemical transport model is used to simulate CO columns and AOD which are used in combination with the observations to optimize the FRP-to-BBR. Monte Carlo exper-

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iments are performed to estimate uncertainties. The method is described in detail for each step and is a nice scientific contribution. I recommend publication with very minor changes listed below. 1. Figure 1, instead of a linear scale, the authors may consider label the color bar with words such as “forest”, “grassland” and “neither”. 2. Figure 2b, the authors may consider label the horizontal axis with a few dates. The same applies to Fig. 7 and Fig. 8. 3. Why is Equation (5) chosen to model the diurnal cycle? 4. Page 3112, line 21, N_j and N_k should be N_{jl} and N_{kl} for consistency with Equation (4). 5. Page 3113, line2, h_{al}(t) should be h_{la}(t) for consistency with Equation (5). 6. Do the simulations for V_m and V_m(r) have the same boundary conditions?

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